

Video-over-IP as a Specialized Service

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An observation and a question

- **Internet Video is the major driver of infrastructure investment**
 - Cisco VNI: by 2019, **video will be 80% of Internet traffic**
 - Most of this is linear entertainment, aka “TV/Movies”
 - Most of this will be handled by CDNs
 - (Above is a forecast...)
- **Question: What if Video-over-IP were *not* Internet??**
 - Does this traffic *belong* on the Internet?
 - Do we want an Internet optimized for TV?
 - If so, is that still essential infrastructure?
 - How might Internet differ if video-over-IP is NOT part of Internet?
 - Benefits/costs of separate networks? Tech, Biz, policy implications?
 - How might we get there from here (if we wanted to...)?

Video-over-IP as a *Specialized Service*

- **Video traffic is a lot of things... but a lot of it is TV**
 - Linear TV : Netflix, Hulu, Xfinity, HBOGo, etc.
 - YouTube, New Media, Gaming
 - Surveillance/monitoring cameras
 - Video conferencing
- **Linear TV has well defined, distinctive characteristics**
 - Cacheable, delay tolerant
 - One-way, asymmetric traffic (HD video)
 - (inherently) multicast
 - Bundled content+conduit: Subscription, PPV, and advertising supported (“free”)
 - (Copyright protection an issues of special concern?)
- **Internet : heterogeneous, adaptive, anything-over-anything**
 - Ubiquitous Connectivity (anywhere to anywhere)
 - Two-way, symmetric (and everything else)
 - Inherently end-to-end (content under end-user control)
 - Conduit only: Subscription, MB usage tiered, content/application agnostic

Policy Convergence: legacy → future; silos → ?

- **Broadcast/media regulation : content (editorial)**
 - Content regulation: domestic content, porno, public programming
 - Must-carry & retransmission consent
 - Media Concentration
 - Program access, etc.
 - MVPD copyright rules (STELA)
 - First Amendment
- **Telecom (PSTN) regulation : conduit**
 - Universal service: everyone has affordable access to telephone
 - Interconnection: ubiquitous connectivity, including international (ITU)
 - Advanced Services (S706)
 - CALEA, e911, etc.
- **Broadband: Open Internet Order (OIO)**
 - BIAS : open, neutral Internet access
 - Non-BIAS (aka, Specialized Services) : ?? Unregulated ??

Benefits of separate Internet & Video-over-IP networks?

- **Technical: separate networks share resources when efficient**
 - Internet: lower average data rate, higher peak/average
 - Layer 3 isolation easier (agnostic about PHY/application layers)
 - Separate networks: multi-homing, end-user autonomy, resiliency, ...
- **Business Model: integrators bundle silos at retail**
 - Today' s triple play: separate networks for Internet, VoIP, IPTV
 - Capacity isolation \Leftrightarrow ensure min allocation resources to each
- **Regulatory: regulating "silos" focuses scope of regulation**
 - **Universal service**: subsidize basic infrastructure, not entertainment
 - **Interconnection**: IP Video interconnection regulation (if needed) better than general Internet interconnection regulation.
 - **Advanced services**: Optimize Internet for IoT future – smart healthcare, energy, eGovernment, *not* more ways to enjoy toys...

Some research questions...

- **How might we get there from here?**
 - How does this impact OIO? OVD review? PSTN transition?
 - Is it desirable *and* feasible to define Title II IPTV service?
- **Implications for measurement?**
 - How does performance measurement differ when Video is part of Internet traffic v. when Video is separate network (that may share resources)?
 - Implications on Video performance measurement?
- **One or multiple networks better?**
 - How does separate network for specialized services impact value of *Differentiated Services for Internet (v. Best effort)*?
 - (*For whom? Which is easier to evolve?*)
- **Lots more....**

Other stuff...

- **OIO Concerns about specialized services**
 - Reachability (¶47): BIAS is about general reachability. A service that is for special application not BIAS.
 - Capacity Isolation (¶ 112): Protect BIAS from “dirt road”
 - Pricing & Payment (¶114): Attempts to hide BIAS as non-BIAS
- **MVPD Review: FCC NPRM (December 2014)**
 - OVD reclassification? (Aereo...)